

In the claims:

Following is a complete set of claims as amended with this Response.

1-17. (Canceled)

18. (New) A method of locating mobile devices, the method comprising:

measuring times of arrival of an uplink signal from a first mobile device at each of at least three measurement units;

computing a location of the first mobile device based on the measured times of arrival of the uplink signal;

measuring at the at least three measurement units times of arrival of downlink signals from each of at least three base stations;

receiving time of arrival measurements of the downlink signals from a second mobile device; and

computing a location of the second mobile device based on the measured times of arrival of the downlink signals and the received time of arrival measurements from the second mobile device.

19. (New) The method of Claim 18, further comprising measuring times of arrival of the downlink signals at the second mobile device.

20. (New) The method of Claim 18, wherein computing a location of the first mobile device comprises implementing an uplink location algorithm and computing the location of the second mobile device comprises implementing a downlink location algorithm.

21. (New) The method of Claim 18, wherein computing a location of the second mobile device comprises:

defining a first hyperbola based on the measured times of arrival of the at least three measurement units;

defining a second hyperbola based on the received time of arrival measurements ; and
locating an intersection of the first hyperbola and the second hyperbola.

22. (New) The method of Claim 18, wherein the uplink signal comprises a random access channel signal.

23. (New) The method of Claim 18, wherein the downlink signal comprises a broadcast channel signal.

24. (New) A method of locating a mobile device, the method comprising:
determining at each of at least two measurement units times of arrival of an uplink signal from the mobile device;
determining at the at least two measurement units times of arrival of downlink signals from each of at least two base stations;
receiving from the mobile device time of arrival determinations for the downlink signals from the at least two base stations; and
computing a location of the mobile device based on the determined times of arrival.

25. (New) The method of Claim 24, further comprising sending the determined times of arrival to a mobile location center and wherein computing a location comprises computing a location at the mobile location center.

26. (New) The method of Claim 25, wherein receiving the time of arrival determinations from the mobile device comprises receiving the time of arrival determinations from the mobile device at the mobile location center.

27. (New) The method of Claim 24, wherein computing a location of the mobile device comprises implementing an uplink location algorithm and implementing a downlink location algorithm.

28. (New) The method of Claim 24, wherein computing a location of the mobile device comprises:

defining a first hyperbola based on the times of arrival of the uplink signal;
defining a second hyperbola based on the times of arrival of the downlink signals; and
locating an intersection of the first hyperbola and the second hyperbola.

29. (New) The method of Claim 24, wherein the uplink signal comprises a random access channel signal.

30. (New) The method of Claim 24, wherein the downlink signal comprises a broadcast channel signal.

31. (New) A system for determining the location of a mobile device comprising:
an uplink processor to implement an uplink location algorithm;
a downlink processor to implement a downlink location algorithm;
at least three base stations, located at known locations, to communicate with the mobile device; and
at least three measurement units, having an uplink mode and a downlink mode,
wherein, in the uplink mode, each of the measurement units determines a time of arrival of an uplink signal that originated from the mobile device and reports the determined time of arrival to the uplink processor, and the uplink processor determines the location of the mobile device using the uplink location algorithm based on the times of arrival reported to the uplink processor by the measurement units, and

wherein, in the downlink mode, the mobile device determines times of arrival of downlink signals arriving from each of the at least three base stations and reports the determined times of arrival to the downlink processor, the measurement units collectively determine a time of arrival of

downlink signals that originated from each of the at least three base stations and report the determined times of arrival to the downlink processor, and the downlink processor determines the location of the mobile device using the downlink location algorithm based on the times of arrival reported to the downlink processor by the mobile device and by the measurement units.

32. (New) The system of Claim 31, wherein the uplink processor and the downlink processor are implemented in the same processor.

33. (New) The system of Claim 31, wherein the uplink processor and the downlink processor are implemented in discrete devices.

34. (New) The system of Claim 31, wherein each of the measurement units includes a dual mode uplink/downlink receiver.

35. (New) The system of Claim 31, wherein each of the measurement units include a downlink receiver that is distinct from the uplink receiver.

36. (New) The system of Claim 31, wherein each of the measurement units determines times of arrival for signals corresponding to at least two different communication protocols.

37. (New) The system of Claim 36, wherein the at least two different communication protocols includes time division multiple access (TDMA) and global system for mobile communication (GSM) systems.

38. (New) An apparatus comprising:
a receiver to note a time of arrival of an uplink signal arriving from a mobile device at an unknown location, to forward the noted time of arrival of the uplink signal to an uplink processor, to note a time of arrival of a downlink signal arriving from a base station at a known location, and to forward the noted time of arrival of the downlink signal to a downlink processor.

39. (New) The apparatus of Claim 38, wherein the receiver comprises a uplink circuit

card to note the time of arrival of the uplink signal and a downlink circuit card to note the time of arrival of the downlink signal.

40. (New) The apparatus of Claim 39, wherein the uplink circuit card and the downlink circuit card are plugged into a common backplane.

41. (New) The apparatus of Claim 40, further comprising a controller plugged into the common backplane to control the uplink circuit card and the downlink circuit card.

42. (New) The apparatus of Claim 40, wherein the uplink signal comprises a random access channel signal, and the downlink signal comprises a broadcast control channel signal.

43. (New) The apparatus of Claim 40, wherein the receiver determines times of arrival for signals corresponding to at least two different communication protocols.

44. (New) The apparatus of Claim 43, wherein the at least two different communication protocols includes time division multiple access (TDMA) and global system for mobile communication (GSM) systems.

45. (New) The apparatus of Claim 40, further comprising a mobile location center comprising:

the uplink processor to receive the forwarded time of the arrival of the uplink signal and to implement an uplink location algorithm; and

the downlink processor to receive the forwarded time of arrival of the downlink signal and to implement a downlink location algorithm.